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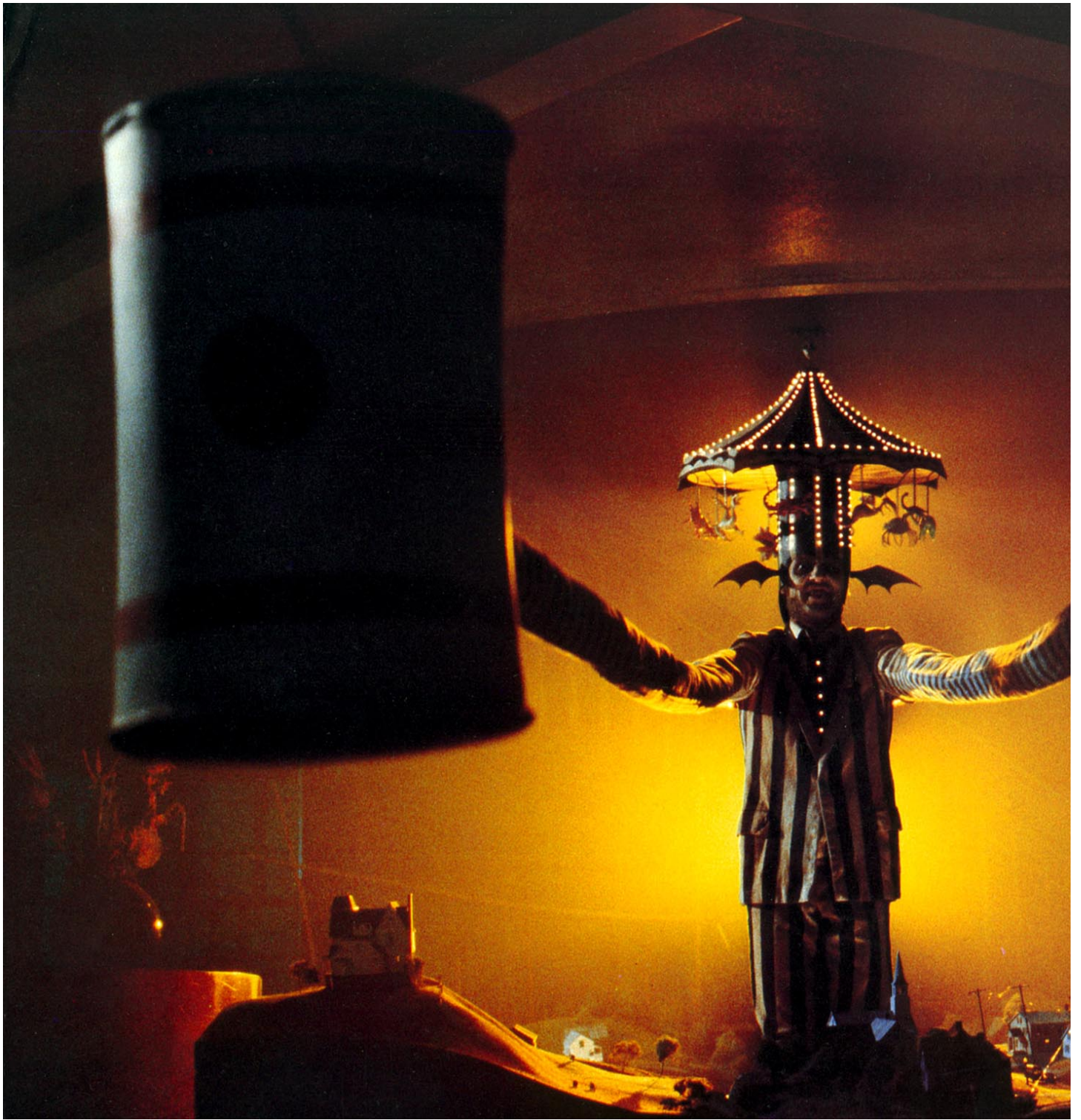
Cheap and Cheesy and Off-the-Cuff 4

To produce a wildly offbeat supernatural comedy with wall-to-wall effects and limited funding, *Beetlejuice* director Tim Burton turned to first-time visual effects supervisor Alan Munro who assembled a choice team of cost-conscious independents willing and able to conjure up hundreds of effects shots for a very small portion of the film's \$14 million budget. In charge of creature creation and makeup illusions was principal effects contractor Robert Short; providing opticals and miniature support was Peter Kuran of Visual Concept Engineering; and tasked with enlivening three highly specialized animation sequences were Doug Beswick, Ted Rae and Tim Lawrence. Together they assembled the fanciful imagery that helped make *Beetlejuice* the first big hit of the summer season. *Article by Jody Duncan Shannon.*

Visit from a Small Planet 44

When Amblin Entertainment brought *Batteries Not Included* to Industrial Light and Magic, visual effects supervisor Bruce Nicholson found the prospect of creating a family of pint-size anthropomorphic flying saucers both intriguing and challenging. Principal among the challenges was the need to create ships that could be photographed in real time on live-action sets and also in bluescreen environments under motion control. Most importantly, the imagery produced through employment of these two techniques had to be stylistically indistinguishable even when cut together end to end. Developed to support the effort was a sophisticated new wire rig and a winning array of flying machines brought to life via overhead wires, motion control, rod puppetry, stop-motion animation and go-motion. *Article by Richard Linton.*

FRONT COVER — A giant Betelgeuse snake glowers at its victims in *Beetlejuice*. Baby saucers encounter a hubcap in *Batteries Not Included* — BACK COVER.

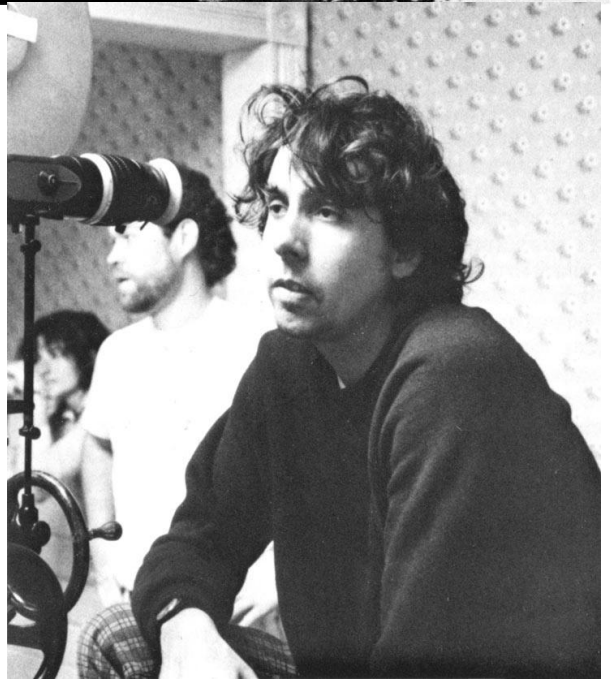




Cheap and Cheesy and Off-the-Cuff

The Effects of BEETLEJUNK

article 1
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Shan*





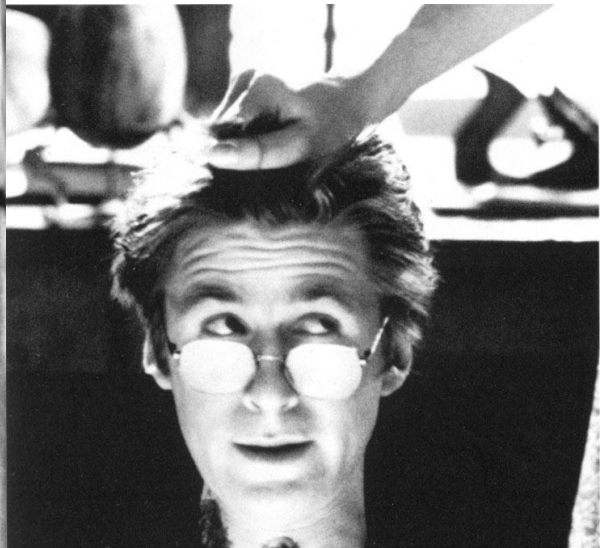
maquette, within those parameters we the thing so that his arms would flay c bob up and look like he was screaming. to come in for a closeup of the eyes look hands would grab Geena Davis and the land a big kiss on her and then pop o Laine Liska made a skeletal understru wrapped with foam and covered with a l produce a bonelike texture. Linda Frob the sculptural aspects and Mike Moore system that allowed the arms and head flight. "Fortunately, Alan's storyboards lineated as to what shots each piece we idea was to have the corpse start out in when he popped out of the grave on wi solenoid system would be activated and open. Next the action would cut to a r head which meant that the cables in assembled by Fred Spencer and Don Mat ually operated while just holding the b to the hands grabbing Barbara and the meant that we could pop the arms off t them in conjunction with a second hea to look like it was kissing. Finally we reassembled puppet being thrown to Thanks to Alan's storyboards, we could c on those aspects of the puppet that wo there was no need to overbuild. It was a tional way to go." After three weeks puppet corpse was finished. Not only did functions, but it was also an exact dup Ironically, however, even though it sec contract for Bob Short, the Kissy-face , be dropped from the film. A late rewrit to pop out from the grave instead of his

Though bumped from the film, the Ki as a foreshadowing of the kinds of outl would be called upon to create for *B* realizing that the challenges on this s monumental when the designs started had this zany kind of feeling to them. problem of creating life out of thing anything known to be alive! It was dif were getting designs and doing our cons time — an overlapping process that ra

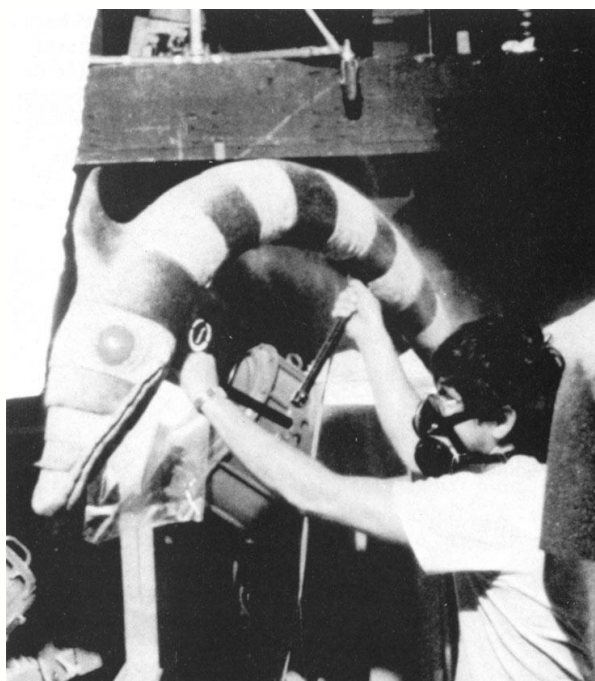


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a closet, Barbara is inside hanging from a noose. Getting no reaction — and unaware that mortals cannot see her — she then reaches up and pulls the skin off her face, exposing a screaming skull with eyes dangling out of their sockets and a big grinning mouth containing twice as many teeth as should be there. "The skull seems to be based on Barbara's idea of what a skull would look like and what would be scary," Short noted, "rather than what a medical student's rendering would be. The upper part of the skull was made out of fiberglass to hold the mechanisms. The lower jaw, because it had to drop down and then extend a little bit further than a normal jaw, was made out of foam latex and then painted to match the fiberglass. The eyes had to spring out, but not *straight* out. They had to come out at a certain arc and then droop down, which meant that we had to find just the right kind of flexible rod to work with the weight of the eye-balls." Three puppeteers were required to operate the finished puppet — one for the body, one to control the eyes and a third to puppeteer the mouth.

For the scene in which Barbara pulls the flesh off her face, a lifemask of Geena Davis was put over the skull apparatus. "We had done a generic head cast to use for other appliances, and on the same day we did a lifemask with Geena doing a grimace. We could have simply resculpted the generic face to give us the expression we wanted, but I've found that the closer one is to the original expression in the alginate, the better." On set, Geena Davis stood in the closet with the hangman's noose around her neck. With a grimaced expression, she reached up with her hand to cover her face — at which point a cut was made to the artificial head. "Geena was actually down on her knees, beside the puppet. On cue, she reached up and grabbed the facial appliance off the skull, so her hand matched and the movement was right. We had worried how Geena would react to all the makeup and effects work since she was in *The Fly* and had witnessed what Jeff Goldblum went through on that film. But she was really excited about having it all done. As a going-away present, we gave her a replica of her grimacing head."

Undaunted by Barbara's failure in the closet, the Maitlands try once again to frighten the intruders away. As the new owners enter the den, Barbara stands wielding a knife with Adam's beheaded corpse at her feet and his head dangling from her fingertips. Once again, the mortals fail to see anything and promptly head upstairs to check out the attic. In his eagerness to prevent them from discovering the attic hideaway, Adam jumps to his feet and rushes up the stairs — past the inspecting party — leaving his severed head behind.

Paramount among the problems the sequence presented was the fact that the severed head held in Barbara's hands had to speak. "We talked about a lot of different ways we could do this shot," Munro commented. "We talked about bluescreening his

To avoid a bluescreen planet, Munro's small force constrains the overall design: the setting is deep, the scene is giant, and the elements are an array of shots in the featured 'sand' cloud for approach, realizing the including stop-motion and animation. Beswick: / Also em foot-long construct facility at with high VCE. / An puppet — numerou:





more apparent interaction between the ment. "When the worm dove, we wanted that it looked more realistic. To do that generator' — just a teeter-totter type s with sand. When we pounded it, the sand air. In each shot we would find where th with the sand and position this thing in frame and at the proper size and just le shot against black and lit pretty hot mattes off of them."

In addition to the full six-foot puppet constructed another that was twice its the front third of the sandworm. This v be used as the sandworm continues its era, finally crossing in front of the lens. The storyboards called for an 'inner wor outer worm, snapping and biting at B lips were articulated as well as the tor "and the mouth could open and clos movement — blinking and moving bac num skeletal structure supported the pu section of fiberglass made for the skul scale nose section for a shot of Barba creature on the snout. "It was about ti attached to a cart and a counterweight be pushed along and snap like a pair of ja ramp for the thing to run across so it dip into the shot and snap at Geena ar it. It took about three guys to operate except for a few times when the jaws snapping. Unfortunately, when we final of the mouth, Geena was just a bit slo had to go back in postproduction and — using the smaller puppet against a then be matted in with previously shot

Though many shots of the mechani remain in the film, Tim Burton made them with stop-motion. Doug Beswick build the stop-motion sandworm and "We built a stop-motion puppet of the f Beswick explained. "It was three feet lo the size of the cable-controlled worm particular scale. Since the worm was su simply picked a size that was the smalle get away with and still get the detail. M



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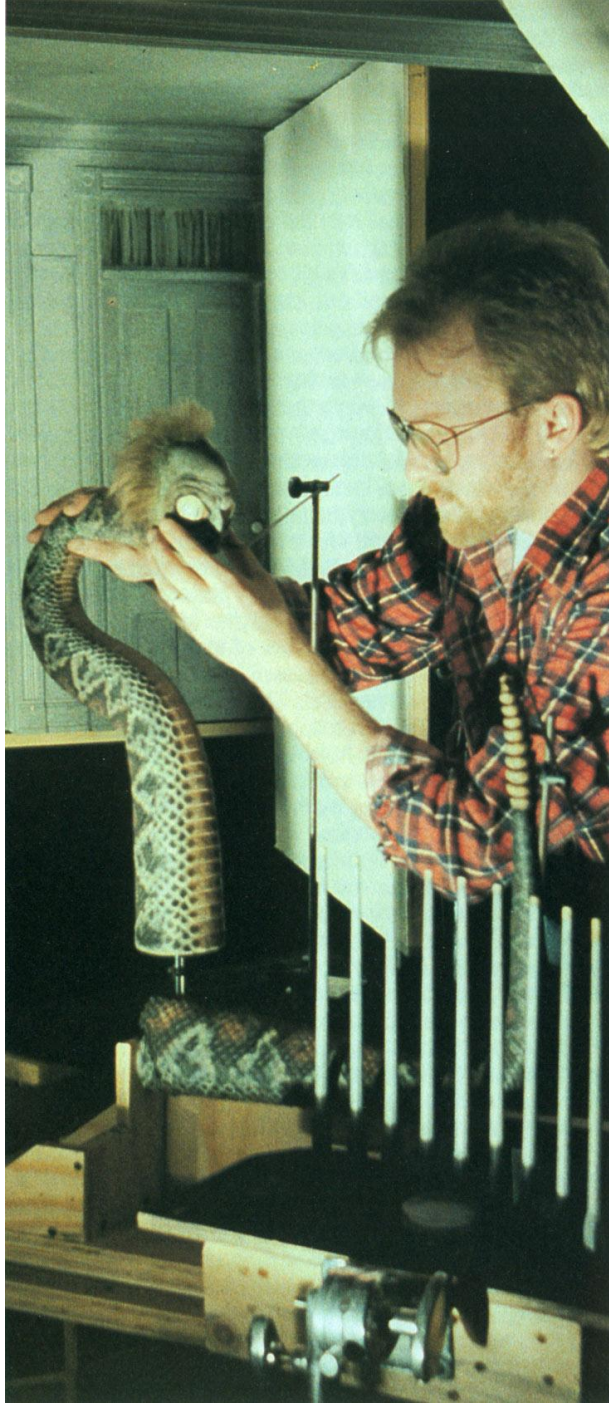
spring return on it so we could get the whole thing to snap open, do its little number and then spring back down into its original position. Attached to it were eight tentacles sculpted from a really lightweight latex skin with polyfoam fill. Each one had a very simple cable mechanism inside that enabled it to contract in on itself and flail around. Then to add a bit more movement, Dave Beasley integrated lightweight latex air hosing that ran the length of each tentacle. By slicing the ends of the hosing, we would get not only the main appendage flaring out but also this little tentacle that would flap around. We put all kinds of things on the arms to give them movement — feathers and little strands of cotton. So the end result was just a mass of movement and weird shapes undulating about.”

Though impressed with his haunting potential, the Maitlands are leery of bringing the vile Betelgeuse into their situation, especially after he expresses a lascivious interest in Lydia who has befriended them. They take their leave of Betelgeuse — again by saying his name three times — and return to normal size in their attic more determined than ever to do the job themselves. A dinner party Delia has planned for the evening seems a perfect opportunity for an all-out supernatural assault. After studying their handbook, the Maitlands interrupt the party with a bizarre display of supernatural prowess — ‘possessing’ each guest with the essence of a calypso singer until each is moved to join in a spirited version of ‘Day-O.’ After crashing back to their seats, the embarrassed guests and hosts are attacked by their shrimp cocktails which have turned into monstrous crablike hands. “Mike Hood sculpted one of the shrimp hands,” said Short, “and from that we made plaster molds. Keeping with the seafood motif, we created latex gloves that had a lobster-type plating on the back. Those were worn by puppeteers whose hands came up through holes in the table and into the shrimp bowls. Because of the design of the dining room table and the camera angles chosen, the puppeteers at the end of the table were visible underneath. To conceal them, a piece of black velvet was draped off the edge down to the floor. On film it just looks like darkness under the table.”

Far from being frightened out of the house, the partygoers storm the attic sanctuary in an attempt to persuade their resident ghosts to come out of hiding and perform more ‘tricks.’ Only after their tormentors exit do we discover how Barbara and Adam evaded them — by crawling out their attic window from which they are now dangling over the sand planet and its indomitable sandworm. Thoroughly disappointed over their failure to actually see the ghosts, Delia and company start down the stairs, holding onto the banister as they descend. Without warning the railing turns into a giant snake — a hideous incarnation of Betelgeuse bent on destruction and mayhem.

Alan Munro had initially storyboarded the snake as a slender







Though the head was anything but realistic, considerable pains were taken to insure that the body was as snakelike as possible. Airbrush artist Steve Wang provides precise and intricate scale coloration. / Since the snake had several lines of dialogue, it was determined that a two-thirds-scale servo activated rod puppet would be the most expedient approach to achieving the desired end result. Crew member Tom Gleason holds the base of the neck while Marc Tyler and Ted Rae actuate it from above. / Unabashedly irrepressible, the Betelgeuse snake darts between Delia's outspread legs in another employment of the larger scale servo puppet. Eye slits were added later via cel animation. / In a scene employing stop-motion blur, the sinister

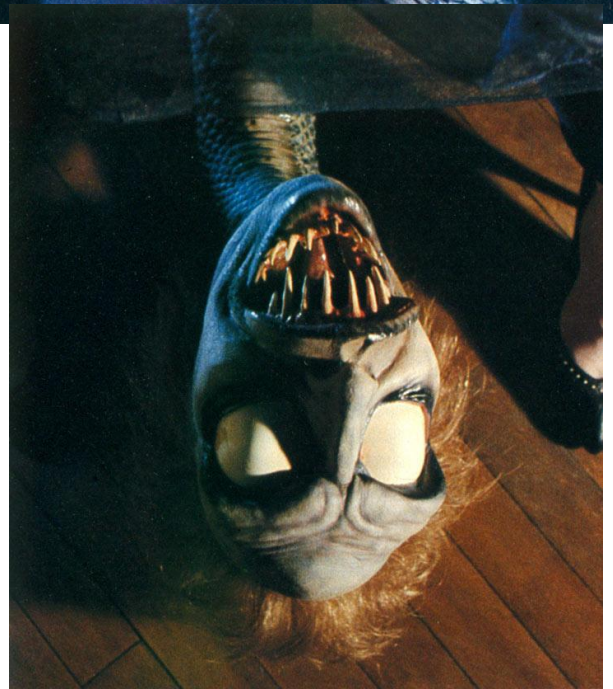
full-size mechanical creature already established. "I went to visit Ted and saw the stuff he had done for *Jaws 4*," Munro recalled, "and I was knocked out by it. There were incredible shots using both animation and puppets. Knowing the complexity of the snake sequence and the many pitfalls we had already encountered, I felt that Ted was the guy to do it. He was fearless about using any approach necessary." Burton had gotten the okay from The Geffen Company to reshoot the snake sequence, but only if it could be done within a specific minimal budget. Knowing it would be tight, but enthusiastic about Burton's design sense, Rae accepted the challenge.

Since the snake was being redesigned from scratch, Rae was able to add his own input. "Our deal stipulation included coming up with a design that Tim and I agreed upon. Rick Heinrichs had done a couple of sketches that looked like Michael Keaton; but I was actually more drawn to the cartoony character Alan had incorporated into his storyboards, so I lobbied for a design closer to that. Tim had a reputation for being adamant about his designs, but he allowed me a lot of input. For one thing, I felt that the body of the snake should be rendered with a leaning toward realism. It would be tough enough to pull the sequence off and have the audience accept an animated miniature as something actually shot on the set without rendering the scale texture in some bizarre pattern. So we brought in a live python and some books on texture to help us render the scales realistically, even though the overall character was still cartoony. We found in studying the python that snakes are not tubular in cross section as the original snake had been. Instead they are almost diamond-shaped — flat on the bottom — and so that was changed right off."

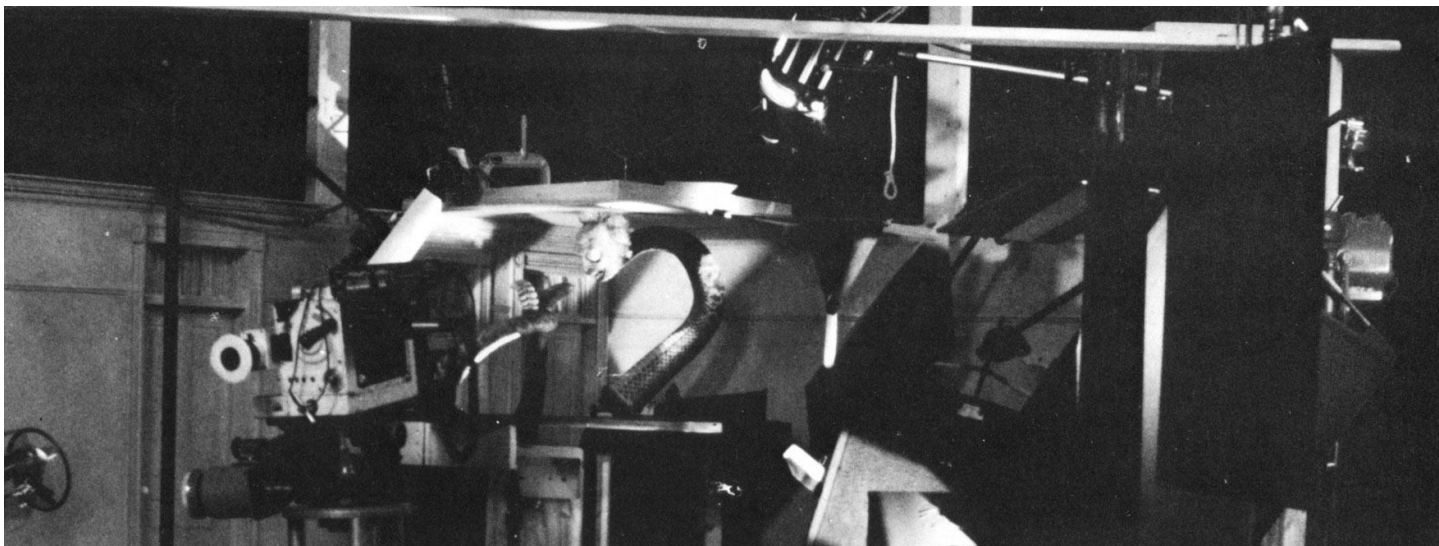
Once the design was set, Rae and company began work on the animation puppets. "The snake was built in five separate pieces at three different scales. Mike Smithson and Sean Mac-Enroe sculpted a six-inch-long pattern for the center section of the body — which at one-third-scale measured three-and-a-half inches in diameter. A silicone mold was taken of the pattern and six duplicate sections were cast up and placed together on a sculpting armature. Mike and Sean then spent a week blending those sections together and sharpening up the scales — darn near going blind in the process. The poor guys kept pleading: 'Can't we make a texture stamp? Can't you think of a way to shortcut this?' I remained adamant, however, aware that the camera was going to be right on top of it. Finally a two-piece plaster mold was made of the whole thing and we wound up with a three-foot section of snake with endless detail on it."

Beetlejuice afforded Rae the opportunity to do something he had long wanted to try — blending rod puppetry with stop-motion animation. "Tim wanted the movement of the snake to be quick and darting — especially in the scene where it comes





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standoffs suspended in the middle of f with two layers of nylon stockings, the glide over the mechanism without grab tached on both ends, it was puppete banister in an S-curve and shot at twelve same mechanism was employed with sl stop-motion shot of the tail whipping eningly at Barbara. "Two pieces of rig through the cable housings and anchored By forcing an angle on the plates and t section formed a snakelike curve and rc the wire. In plotting the move, all I ha it because its path was virtually preani the music wire." This allowed the tai piece which Matt Rose spent two weeks with traditional stop-motion animation

For the head, five sculptors worked amalgam of Michael Keaton and the d sculpture really put me behind because I the design. It was a bugger to match in l three people worked on it, I brought in the genius sculptors of all time — an match our design. Sean then detailed it cracks and textures he had learned w Baker." Rae's own association with mak as Baker and Greg Cannom had likewise ing puppets. "A common problem w puppets is that you generally put an arr have to inject the whole thing at once. I get some horrendous bubble and have l down and start over. Having seen the wa appliances with blending edges, I want puppets in pieces. As a result, the head with an underskull. The fiberglass skull s the head structure past where the ear really no need for movement there an solid to grab while animating. Also, sinc the face to a point just past the cheeks very flexible, low-density foam."

A cast was taken from the back of the into a sculpting armature and the neck into the fiberglass. "That gave us two m could be cast separately in different den was typically solid foam, but cast with which the fiberglass skull was fit. The he registered as one unit. Since the snake



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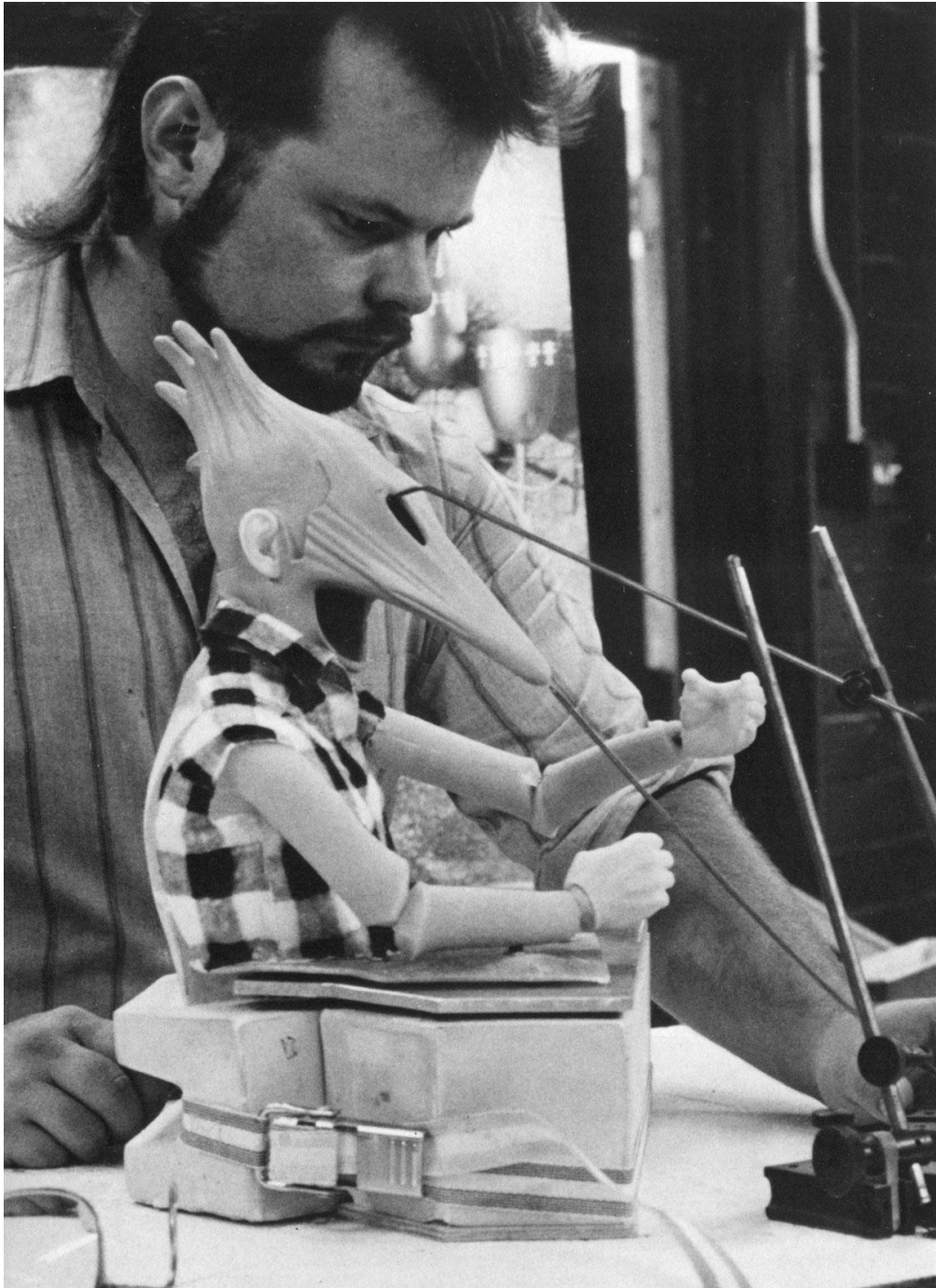
To begin with, Rick Heinrichs did extensive pencil tests of the sequence to determine the number of frames that would be needed as well as exact positioning for the hands. Then, starting with as many photographs of Alec Baldwin and Geena Davis as he could find — along with copies of their lifecasts taken by Bob Short — Tim Lawrence sculpted portrait busts of the two actors in cost-conscious half scale. "I sculpted them bald with a hairline inset," Lawrence commented, "so that on any molds I made the hairline would be in the same place on each. I made Smooth-on molds with vacuform jackets from those sculptures and from each of these molds I poured out five clay copies in Roma Plastilena softened in a microwave. Based on the pencil tests Rick Heinrichs had done to establish the basic action, I then did essentially what an animator would do when animating a cartoon — I chose the key points of the action to establish the flow of the transformation and the attitudes that the heads would take. So I had a portrait at the beginning and an extreme at the end. From there I jumped to the middle, picked one of those heads and roughed it in; then went in between two others and did the same." Once he had the basic flow correct, Lawrence carefully cleaned and finalized each sculpture and then took molds from those — again creating five copies for each extreme. "At this point I had all the heads that I needed in sequence — the first five being the same and the next five being the same, all the way to the end. From there it was a matter of going in and creating the five in-betweens from the first extreme to the second extreme and so on — each one altered just a little bit." Since the camera angle was predetermined, only the sides facing forward were fully sculpted and detailed. In all, Lawrence — assisted by Eddie Yang — wound up making nearly thirty heads to realize Alec's transformation and another twenty-five for Barbara's.

During the construction phase, Lawrence came up with as many shortcuts as possible to keep his expenses down — one being the elimination of some of the mold steps. "The final pieces that were filmed were the original clay sculptures. We covered them all with a base coat of white spray paint and then we used rubber cement for the final paint job because it is so easy to work with — it covers well, it powders well, and you can patch it and add color to the top of it. Even at the final makeup stage, I could rub it all off and start over if I wanted." Working directly with the clay sculptures rather than rigid castings turned out to be an advantage in shooting the sequence. "When we actually got into filming, it became apparent that the way it had been pencil-tested was not going to work. It had been



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wire looped into all the heads and necks which I could grab to move the things between frames and I could also add more clay to make subtle alterations. If I had just sculpted them and done molds on them, I would have had these rigid casts and it would have been very difficult to make changes. This way I had flexibility while I was shooting."

Though the head transformations themselves were achieved through replacement animation, the hand and arm movements were done with stop-motion. A miniature torso — complete with costume and wig — was made for each character. "I came up with a register system where the head was attached to a bust that locked into the table so that it would not move. Attached to the table lock was a fiberglass shell with a miniature costume on it which fit comfortably over the stop-motion arms. So for each frame of film we'd change heads and move the arm a little bit and the hair and lock the next one in." Just the miniature costumes themselves proved to be quite a chore. After photographs of the live-action costumes had been xeroxed down to proper scale, costumer Lynette Johnson made the miniature clothing — first having to find a finely woven material that corresponded to the larger weave of the actual fabrics. Next she hand-colored the patterns of both Adam's shirt and Barbara's floral dress onto the cloth and then finally made the fabric up into half-scale replicas.

Very early in the sequence of events, Lawrence realized that the task was going to be more difficult than he had at first calculated and that many tests would have to be shot as a result. Again trying to keep his costs down, he came up with the idea of using 35mm still film for his tests and then taking it to a custom photo service for same-day E-6 processing. "Instead of running it through at lab minimums just to get the tests back, I reduced my expense from somewhere around fifty dollars per test to about three. I got bulk load film and loaded it into the magazine, and every time I did a test I would just crank off a little bit, snip it off, send it to one of these places and have it back in three or four hours. Then I could roll it through the Moviola and see what needed to be changed to correct register pops and lighting problems and all that stuff." After extensive — but inexpensive — testing, it became apparent to Lawrence that shooting the sequence 'on twos' was never going to work unless the number of heads for each transformation was increased. As an experiment, he decided to try a shot 'on ones' — shooting just one frame for each head rather than two. "Instead of fifty-some frames, the shot ran less than thirty — but it was *much* smoother. Shooting on ones turned out to

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begin to fade from the attic and reappear over the dining room table, degenerating and aging before everyone's eyes. The degeneration was designed to progress in three stages. "We started by doing test sculptures to show Tim where we could go with the design and what each stage would entail," Short revealed. "At first we were rendering them too realistically — and the more realistic they got, the more they became reminiscent of *Night of the Living Dead*. Clearly that kind of horror was not the focus of this show. So we got away from a literal translation into a more fantastic translation — overemphasizing the wrinkles, overemphasizing the frown in the mouth and brow. We moved towards something that would be a statement of the overwhelming sadness that is supposed to be transpiring during the degeneration." Short engaged several sculptors to create prototypes, looking for the artists who would best capture the specific style required. Final sculpting was accomplished by Mike Mills, Jon Price and Dave Atherton.

Stage one of the degeneration was represented by very wrinkled skin which included a full-face, single piece appliance for each actor, a skullcap and separate ears. Also required was a neck piece for Alec Baldwin and a chest piece for Geena Davis because of her low-cut gown. "We had considered creating separate pieces — forehead, nose, cheek and lower jaw — but there was really no need to be that subtle. This stage was so exaggerated that a single piece for the entire front of the face worked just fine." Stage two involved even more severe wrinkling, rendered completely without regard to the actual contours of the human face. "We went for a stylized flow and feeling — going for the emotions behind the design rather than with the reality of bone structure. Again the wrinkling was achieved using full face appliances, skull caps and ear and neck pieces. Both stages also required custom wigs for each actor — for Alec it was a receding hairline and for Geena it was just a matter of her hair thinning out and graying. We also made hand appliances to wrinkle the skin on the backs of their hands." Tim Burton had requested that the characters' skin turn ghostly pale during the degeneration, so Short and his crew incorporated a whitish, noncolored look into their appliances.

Though the original intent had been to render the process in three stages, Tim Burton found stage three — even in a fantasy-like manifestation — to be too grotesque. So ultimately the third stage makeup was dropped in favor of augmenting the basic stage two makeup with a more dramatic change in the hair. During this final stage of degeneration, Adam takes ahold



begin to fade from the attic and reappear over the dining room table, degenerating and aging before everyone's eyes. The degeneration was designed to progress in three stages. "We started by doing test sculptures to show Tim where we could go with the design and what each stage would entail," Short revealed. "At first we were rendering them too realistically — and the more realistic they got, the more they became reminiscent of *Night of the Living Dead*. Clearly that kind of horror was not the focus of this show. So we got away from a literal translation into a more fantastic translation — overemphasizing the wrinkles, overemphasizing the frown in the mouth and brow. We moved towards something that would be a statement of the overwhelming sadness that is supposed to be transpiring during the degeneration." Short engaged several sculptors to create prototypes, looking for the artists who would best capture the specific style required. Final sculpting was accomplished by Mike Mills, Jon Price and Dave Atherton.

Stage one of the degeneration was represented by very wrinkled skin which included a full-face, single piece appliance for each actor, a skullcap and separate ears. Also required was a neck piece for Alec Baldwin and a chest piece for Geena Davis because of her low-cut gown. "We had considered creating separate pieces — forehead, nose, cheek and lower jaw — but

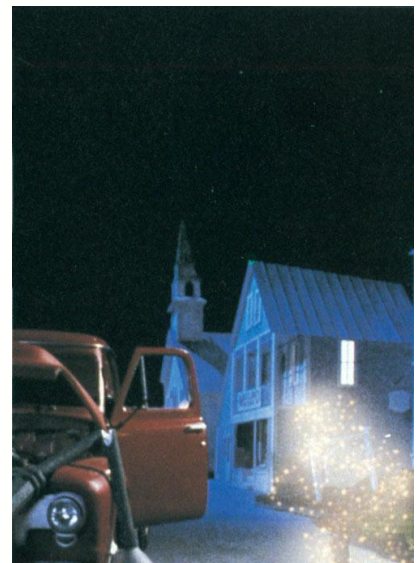
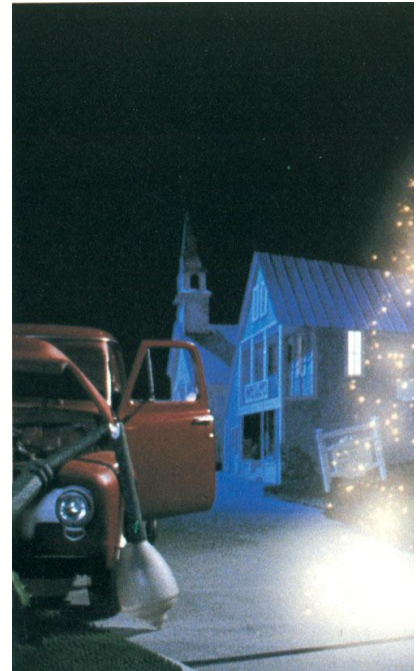


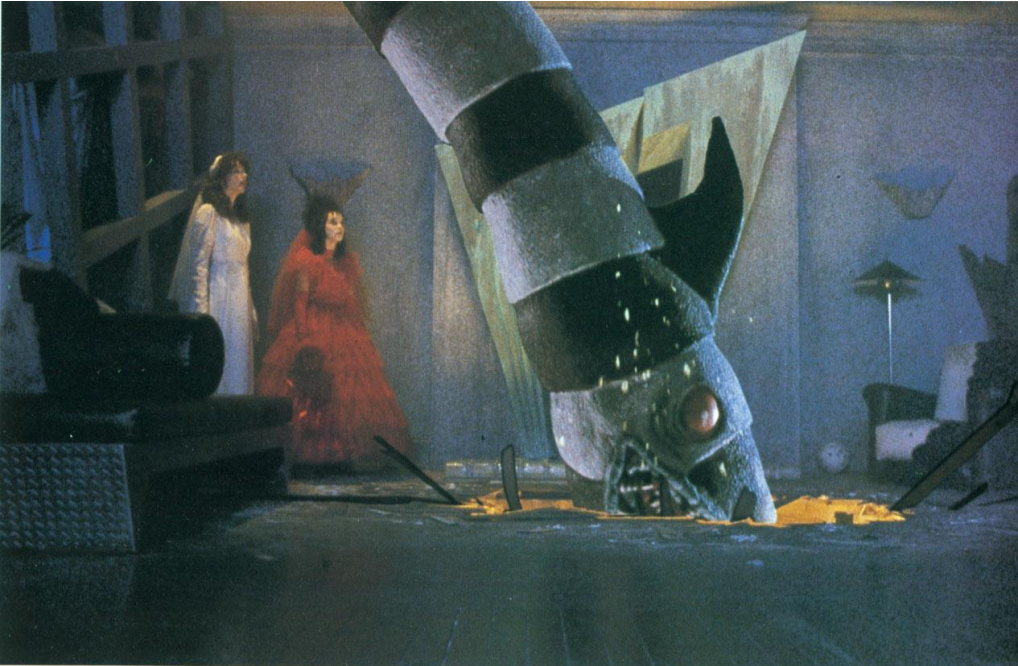


When Adam attempts to disrupt the wedding ceremony, Betelgeuse zaps him into the miniature town — an effect accomplished at VCE with rotoscoping and cel animation. / Restrained by the walking sculptures, Charles and Delia Deetz watch helplessly as Betelgeuse prepares to marry their daughter. The 'preacher creature' conjured up by the lecherous bridegroom entailed construction — by Bob Short and his crew — of articulated skeletal hands and an oversize cable-controlled head capable of lip-syncing the wedding ceremony. / Zapped to the sand planet in the fray, Barbara returns moments later — crashing through the ceiling astride the giant sandworm which promptly gobbles up Betelgeuse and then dives on through the floor. Numerous techniques were required to accomplish the brief sequence — among them a stop-motion sandworm coupled with bluescreen footage of Geena Davis. / A high-speed shot of the mechanical worm devouring Betelgeuse and crashing into the floor was

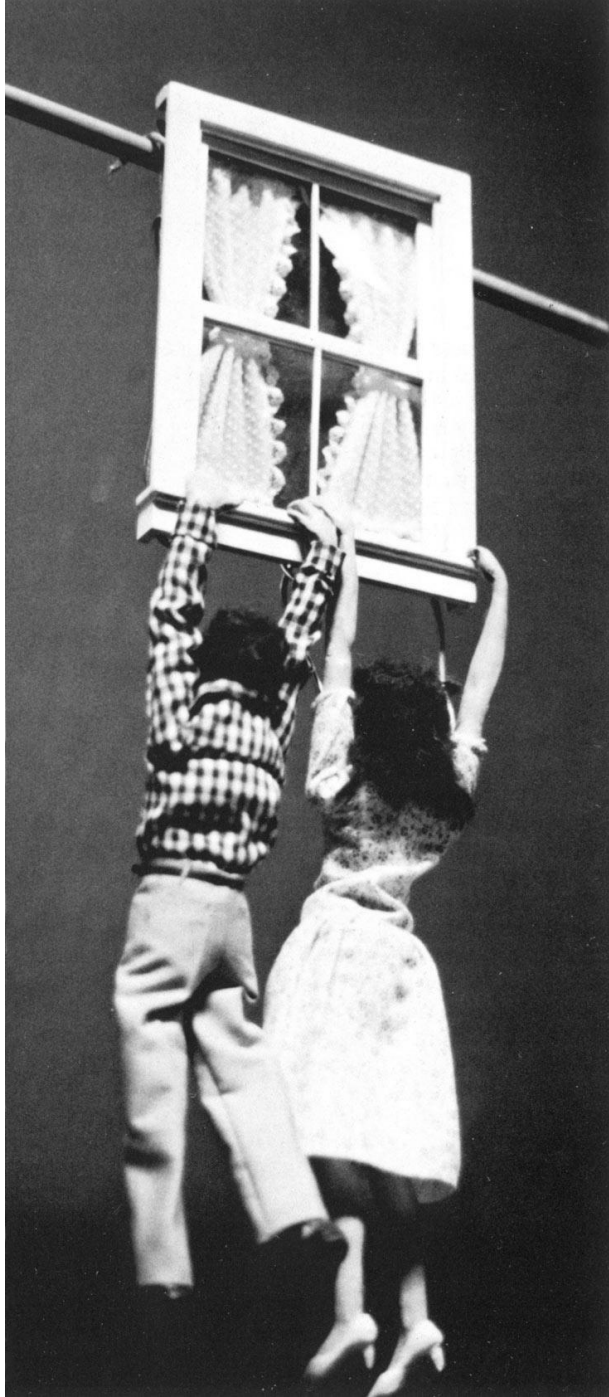
the huge mallets — two-and-a-half feet tall and a foot-and-a-half in diameter. Though invisible to the camera, the arms also extended three feet behind Michael Keaton where they joined together as a common handle. The fulcrum was right at his shoulder. "Pete Gerard would stand in a hole in the floor — hidden from view — and he would pull down the handle to lift up the arms. There was a small counterweight at the handle — about fifty pounds — to help him raise the arms. Then when he released them they would crash down. Since the mallets were at the end of such long extensions, we had to make sure that they weighed no more than four pounds each — otherwise they would have been too heavy to lift. So even though they look very heavy, they were actually made out of a very thin styrene with rigid polyfoam at the bottom to keep them from crushing in on themselves when they hit."

Wreaking havoc throughout the house, Betelgeuse is nonetheless intent on making Lydia his bride. To that end, he magically turns the fireplace into a wedding altar, summons an unearthly minister and encloses the adult Deetzes in Delia's own come-to-life sculptures. Both the fireplace transformation and the animated sculptures were realized by Doug Beswick. Using the same technique that Tim Lawrence had employed for the head transformations, the fireplace was reconfigured into a wedding altar via replacement animation. After pencil tests were done to establish fluidity and pacing for the shot, Beswick team member Joerg Fiederer commenced construction on the twenty-seven fireplaces it was determined would be needed. Cut from rigid foam, the fireplace shapes — five to eleven inches tall — were carefully sanded and spackled and then photographed in sequence to check for glitches in the animation. Since the actual fireplace had a bronzelike finish with a pattern on it, a realistic means had to be found to render the stretching of that pattern as the fireplace grew. "I came up with a way to transfer the paint job from frame to frame and have it look like it was stretching," Beswick stated. "We did that by painting the pattern onto sheet latex and then laying it on an animation table that had pins on it which enabled us to stretch the latex. From there we traced what the pattern looked like — frame by frame — onto animation paper and photographed it to see if the results were satisfactory. After that the tracings were rephotographed on 35mm slide film with registration marks and projected onto the fireplaces for final retracing and painting." A miniature set representing the adjoining wall was also built. "Two registration pins were put on the back wall and our fireplaces were designed to slip onto those pins so that they would always be in the right place. We took the fine-tuning of the replacement series one step at a time and always shot a test at the end of each step so that if we screwed up we would find it early on and be able to fix it."









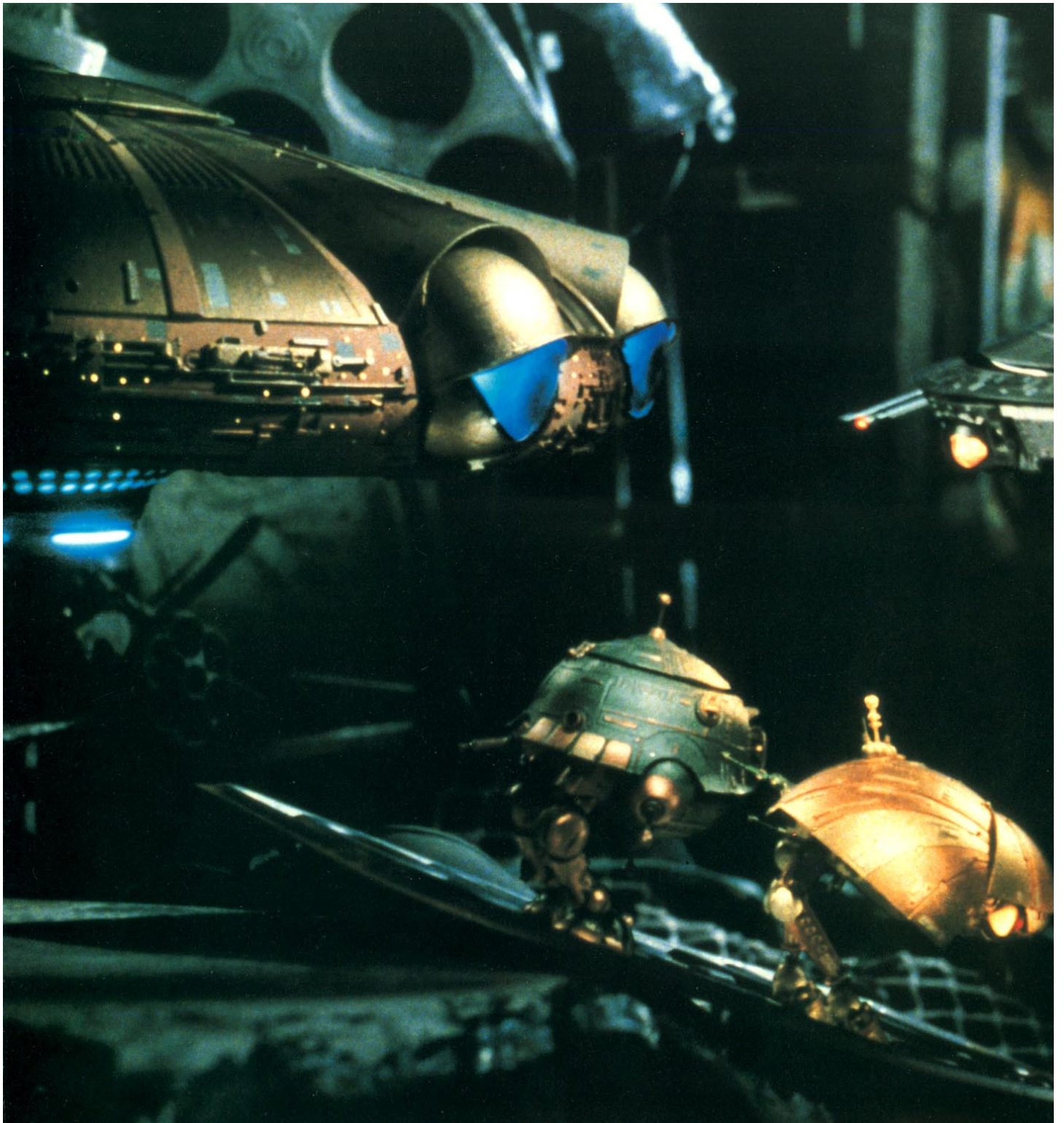


just had it set on an axis so we could slam it down head first. The jaw was puppeteered to make it bite and then bash through. The whole time we were doing this, I thought we would never be able to get the timing so that it looked right — but take after take it worked out. That is one of the shots in the film I am proudest of. It was cheap and cheesy and off-the-cuff — but it looks great.” A final shot of Barbara leaping from the back of the worm as it enters the floor was actually done with Geena Davis jumping from a stepladder on stage. A plate was shot of the worm traveling by and the two were combined optically.

Originally the film was to have ended with Betelgeuse trying unsuccessfully to escape the sand planet and the never-ending sandworm attacks. Tim Burton, however, had a different idea. “I wasn’t sure until the end of the project how we were going to end the film. I had felt that the original ending was not very strong and previews just confirmed that.” The current ending is a kind of epilogue showing Betelgeuse in the afterlife waiting room where he makes the mistake of angering a tribal witch doctor. In retaliation, the witch doctor sprinkles a fine powder over Betelgeuse’s head causing it to shrink down to the size of a grapefruit. “Actually there were two new endings shot and composited,” Kuran revealed. “For the head shrink shot we positioned Michael Keaton in front of a blue screen with his shirt off. Then we did a simple pullback with a zoom lens and composited his head onto a fake body that Bob Short had sitting on the sofa next to the witch doctor. The other shot had Betelgeuse sitting next to Old Bill — the barber from the beginning of the film who rambles on and on as Adam goes into the hardware store. Apparently Old Bill has died, but his rambling monologue lives on. Eventually Betelgeuse freaks and screams his head off — literally. His head pops right off his body and hangs suspended about two feet up with his hair shooting out wildly. For that shot both actors were seated on a sofa in front of a blue screen. As he started his scream, Keaton put his head down a little and then sprang his body back up while we blew air on him to mess up his hair. Later we did a roto which cut his head off at that exact point and then did a camera move on it to lift it off his shoulders.” Preview response was used to determine which of the two endings would earn a permanent place in the film.

Maybe cheap, maybe cheesy, maybe off-the-cuff — yet, the sheer volume of effects completed for *Beetlejuice*, as well as the ingenuity involved in bringing them off, make them worthy of respect. For Tim Burton, the project was a learning experience. “I was not prepared for the difficulty involved in doing the effects for this show, and the experience has changed my mind as to how I would approach them in the future. It is easy to say ‘we’ll take the simple approach’ but it is *never* a simple







visit from a small plane

article
Rich

that I liked the story and was enthusiastic about doing it, and about that time Matthew Robbins was hired to develop the script into a feature. Matthew and I had worked together about four or five years prior to that — I was the optical supervisor on *Dragonslayer*— and we had developed a good rapport. So once he found that I was going to be assigned to the project, he contacted me and we started talking about it. He said that because the saucers were small and in scale to the real world, they were interested in trying to do some of the work on the set. I said that I would love to try and do that, but that we would have to be careful to make sure that the on-set material matched the footage we would be doing optically in postproduction. He said, 'Okay, let's do some tests.'"

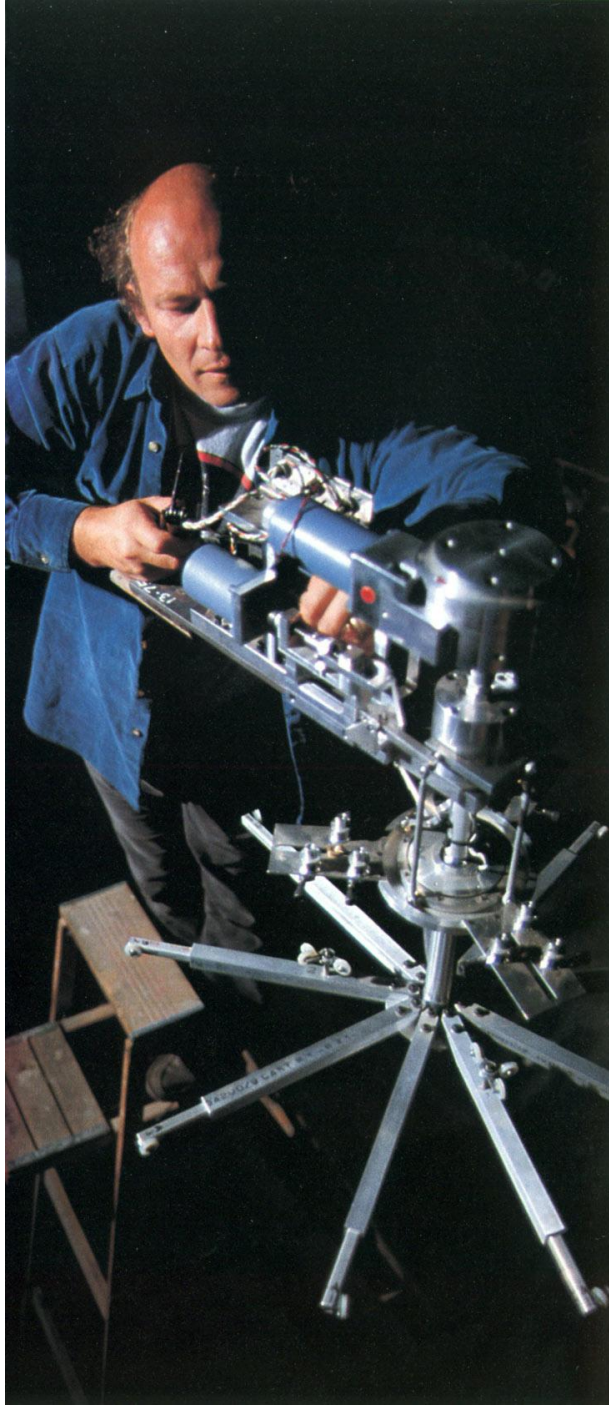
An intense research and development period followed as the script went through a series of rewrites. "We had two things to contend with," Nicholson continued. "We had to come up with a concept for the saucers and we had to develop a rig that we could use to fly them through a live-action set. Matthew had already talked to Ralph McQuarrie a little bit about design, and Ralph had come up with some drawings that Matthew liked. So Ralph came over to ILM and we talked about it and he essentially said: 'Here's what I've done. Why don't you take it from here.' He just handed it off to us."

Model shop supervisor Lorne Peterson was brought in to begin constructing a series of prototypes. Though the McQuarrie concepts provided an initial springboard, considerably more design input was required and so Peterson enlisted modelmaker Paul Huston to fill the bill. Brought in independently at the request of Matthew Robbins and Amblin was veteran miniaturist Greg Jein whose previous work had enhanced such Spielberg epics as *Close Encounters of the Third Kind* and *1941*. Another independent enlisted early in the process was David Allen. Hired principally to supervise the rod puppetry and stop-motion aspects of the film — as he had on *Young Sherlock Holmes* — Allen would spend his initial months on the project designing and constructing articulation mechanisms.

"Instead of having an art director who would generate drawings for approval or rejection," explained Peterson, "Matthew's approach was that he liked to see a lot of prototypes. In keeping with that, Paul would draw sketch after sketch while Greg and I and others in the shop would make maquettes for Matthew's review. He would fly up every few weeks or so to look at literally a table full of prototypes. Originally he conceived of the saucers as a family, so we would make up some Ma and Pa ships and some smaller ones for the kids. He would look them over and make suggestions. Sometimes he would like the eyes on one saucer and would want those eyes on another saucer body. It was a pretty involved process."

Desiring of as much individual expression as possible Rob-

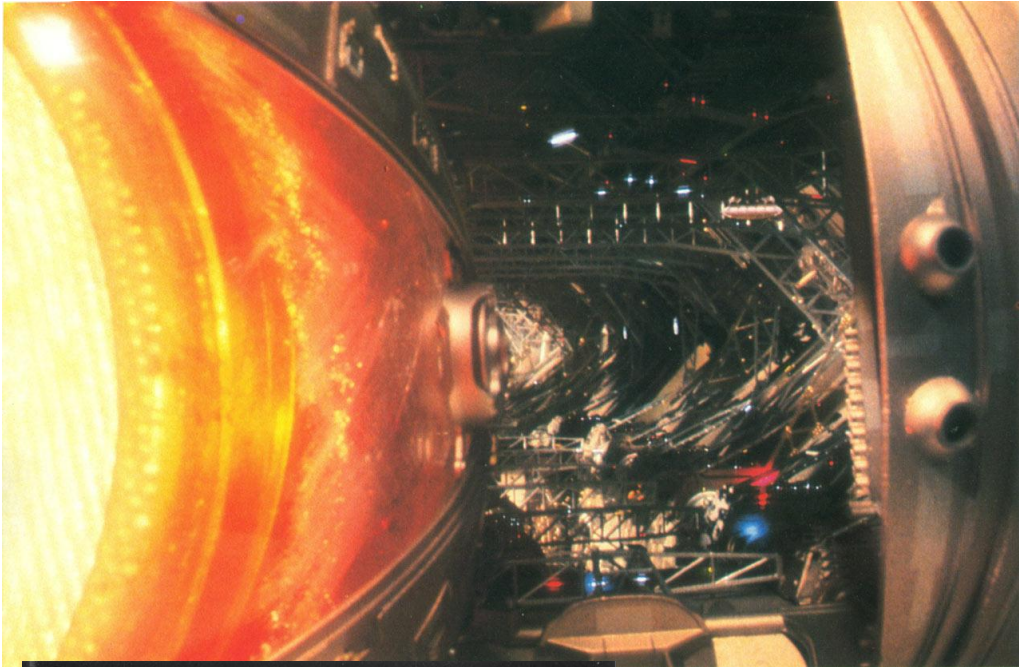












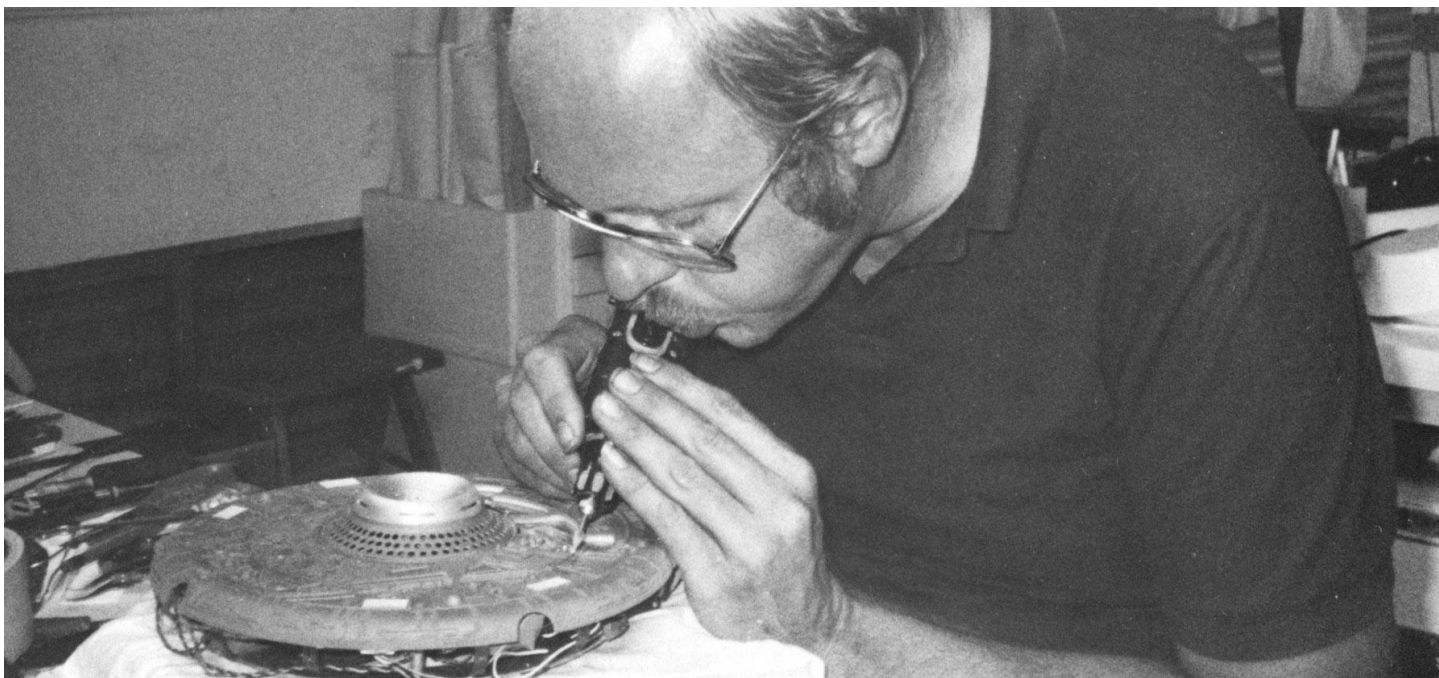


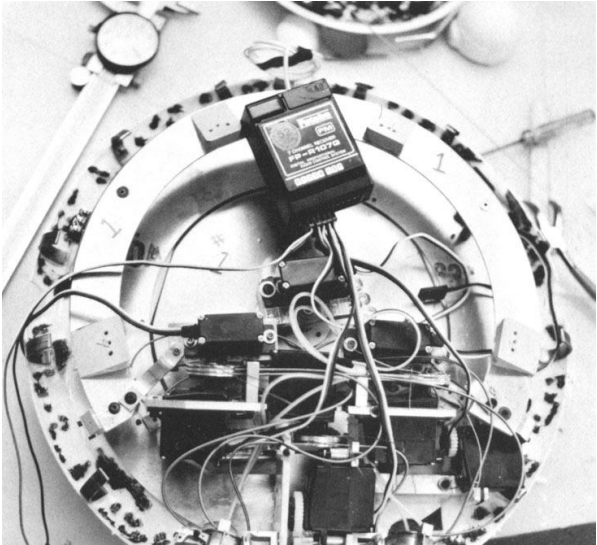
Not only did that make the shots more interesting from an aesthetic point of view, but it also helped blur out the wires which were supporting the saucers."

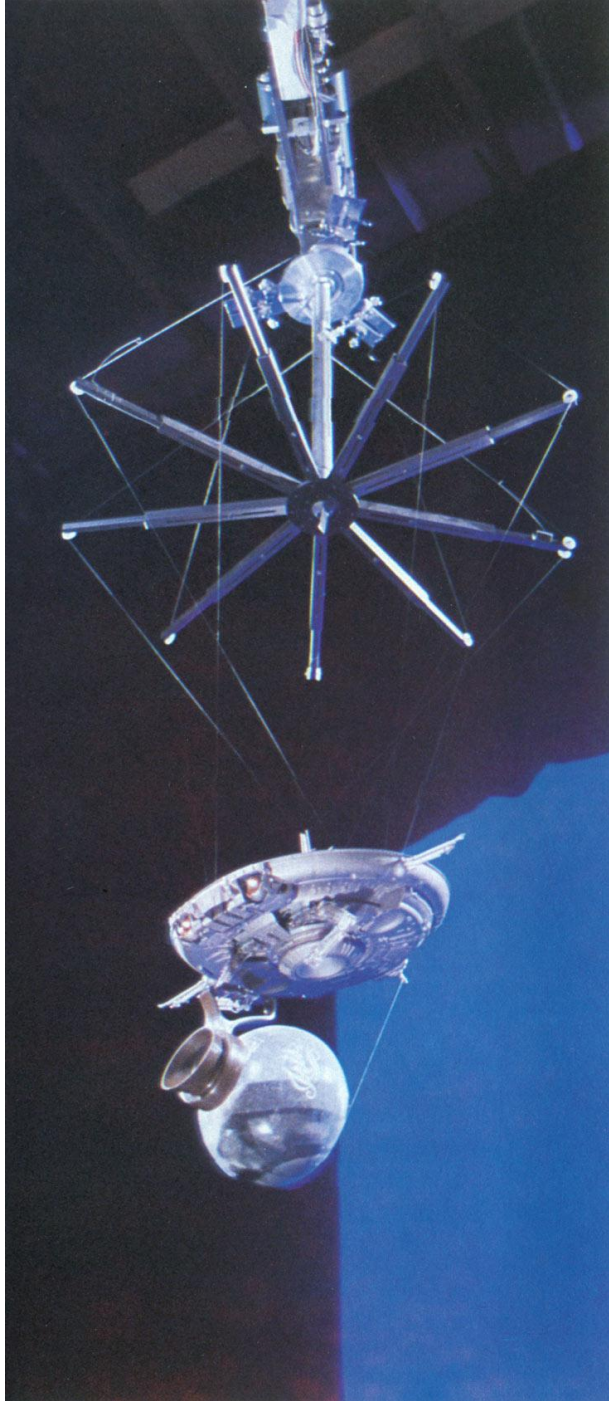
When principal photography wrapped in November, so did the second unit. But the effects work was far from completed. In fact, of the one hundred and seventy-five effects shots intended for the film, only fifty were in the can when Bruce Nicholson and his crew returned to ILM for phase two of the project. "Once we got into postproduction, the first problem we faced was how to match our bluescreen motion control work with the material that was shot live on the set. Throughout the film there would be a mix of shots — often cut end to end — and for that to work we had to make the seams invisible. Not only was it crucial that the optical department come up with perfect composites, but it was equally vital that the saucer moves be uniform from one shot to the next, even when the shooting techniques were not. It seemed logical that one way to insure that would be to adapt our on-set flying mechanism to motion control. Bluescreen would still be employed, but rather than mounting our models on rigid pylons as would normally be the case, we would suspend them on wires from the very same rig we had used on stage at Universal. As soon as I thought of it, I talked to Marty Brenneis and he said: 'No problem. You've got the stepper motors already. All I have to do is interface them with the motion master.' So we did a few tests, and it turned out that for the motion control phase of flying, the mechanism actually presented tremendous advantages because we could program these compound movements with pitch and roll and rotation that would have been very difficult to get otherwise. With a rod or pylon mount, you can generally move in one or two axes, but not three. So that became an advantage for us. The wires were no problem. All we did was paint them with black India ink and the blue just wrapped right around making them invisible. Repeatability was no problem, either. A total of nine wires were attached to three contact points on each of the models, and when they were tuned up to the proper tension there was plenty of stability. We were able to do multiple passes for things like the saucer lights with no difficulty." In recognition of its applicability to future projects, the Tad Krzanowski wire rig was selected for a scientific and technical achievement award from the Academy of Motion Picture Arts and Sciences.

With techniques and technologies firmly established, it was now up to Bruce Nicholson and his team to complete the post-production phase of *Batteries Not Included* — orchestrating a complex mix of live-action wire work, motion control bluescreen material, rod puppeteering and stop-motion animation into a unified whole that would hopefully make one methodology indistinguishable from the next. Camera operator Peter

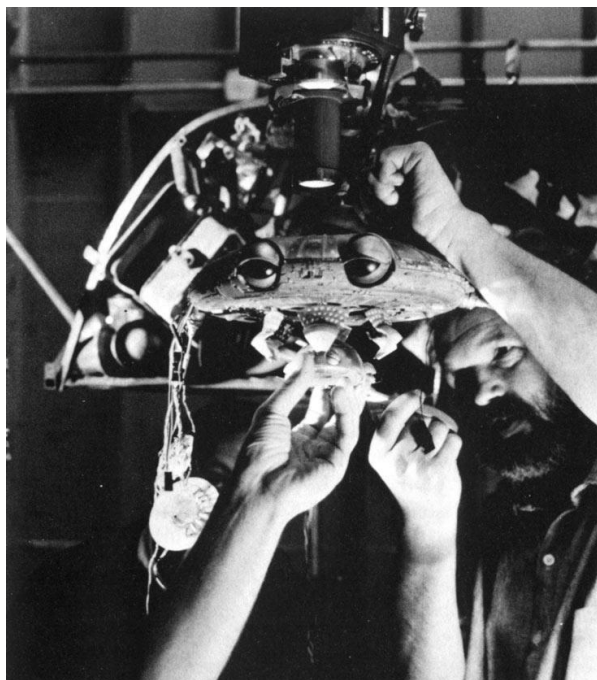
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point in the action. Later, back at ILM, we had to match Ma to the plate so that she comes through the door on cue, sees Pa and then appears to pull the nightgown off. That was only one of many shots where we had wire elements and motion control elements working together — though actually they were all wire elements since we principally used the same wire rig as was used on the set, filmed against bluescreen. Though the same models were used in both applications, color timing between the live-action and postproduction proved to be a minor problem because of the reflectivity of the ships which had a lot of gold tones in them." Dulling spray applied to the models during the bluescreen passes helped alleviate this problem and also minimized the likelihood of blue spill.

Continuing their odyssey through the tenement building, the tiny saucers pause intermittently to reconstruct a torn photograph, repair a broken door, reassemble a shattered figurine and generally undo the earlier attempt by gangleader Carlos Chavez (Michael Carmine) and his goons to ransack the already dilapidated structure and intimidate its few remaining inhabitants. Though the photograph was originally to have been reassembled on screen, in the final film only the results of the alien beneficence can be seen. "It was another stop-motion shot done at Universal," said Allen. "The torn-up photo was spread out on a table in the living room and I pieced it back together. I think most people would have done that shot in reverse, but I opted not to and I think it worked very well. At the end I did a little substitution, which of course would have needed a dissolve to finish off the shot. But for some reason or other it was cut out of the picture."

Like extraterrestrial pack rats, the saucers leave behind the artifacts they have resurrected but take others in their place. Awakening to the sounds of alien activity, Faye finds the cherished photo mysteriously repaired and then notices her toaster being dragged up the stairs by its cord. Climbing to the roof to investigate, she discovers that the extraterrestrial visitors have appropriated a rooftop pigeon coop and converted it into a nest of scrap metal and pilfered electrical appliances. Since Faye is a few cards short of a full deck, her husband and neighbors tend to discount her explanation for the evening's curious happenings; so in the morning she assembles them on the roof, takes Frank's watch from him and smashes it. Moments later, the saucers appear and in a frenzied blur quickly restore the shattered timepiece.

"The watch fix was originally going to be done off-camera," Nicholson recounted. "But then it was added. When the original December 1986 release date went by the wayside, we worked instead toward a summer release and had the film finished by June. At some point, however, it was decided that *Batteries* was really a Christmas picture and so it was held over until December

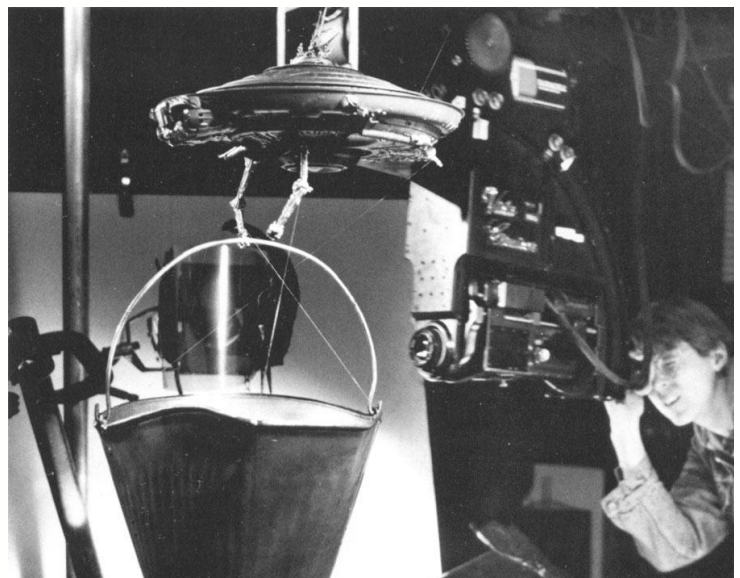
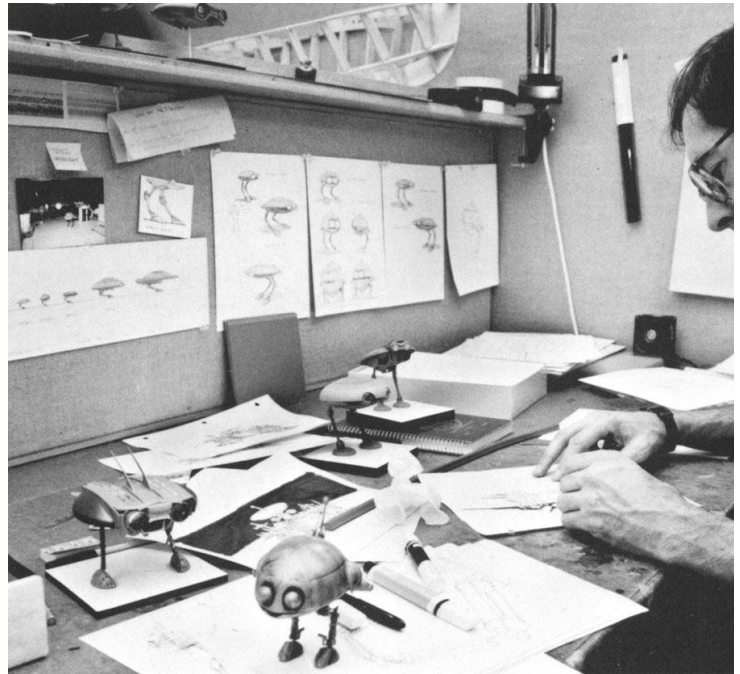
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where he is inadvertently draped with a slice of melting cheese and served up on a bun to one of the counter patrons. "For the cheeseburger sequence," Dave Allen recalled, "Greg Jein made a special rod puppet model using one of the castings of Jetsam and then building a foam rubber cheeseburger around it. He used real bread for the bun — I know, because it kept shedding crumbs — and the feet came out the bottom so we could run it around. As with most of the other scenes, Bob Cooper was my assistant. He has a strong background in puppeteering and a lot of good ideas, and he was especially adept at working the legs. Together we would lay down a piece of paper and trace out where the puppets had to go in accordance with whatever was happening on the plate. Then Dave Hanks would come in with a saber saw and cut eighth-inch slot trails right through the mirrorized plexiglass. When we were puppeteering, we always had to have spacers — little stand-offs — between the feet and the plexiglass so that the reflection wouldn't meet itself. Otherwise it would be extremely difficult for the roto department to determine where the bottom of the feet were supposed to be when it came time to clean up the bluescreen mattes and remove the rods.

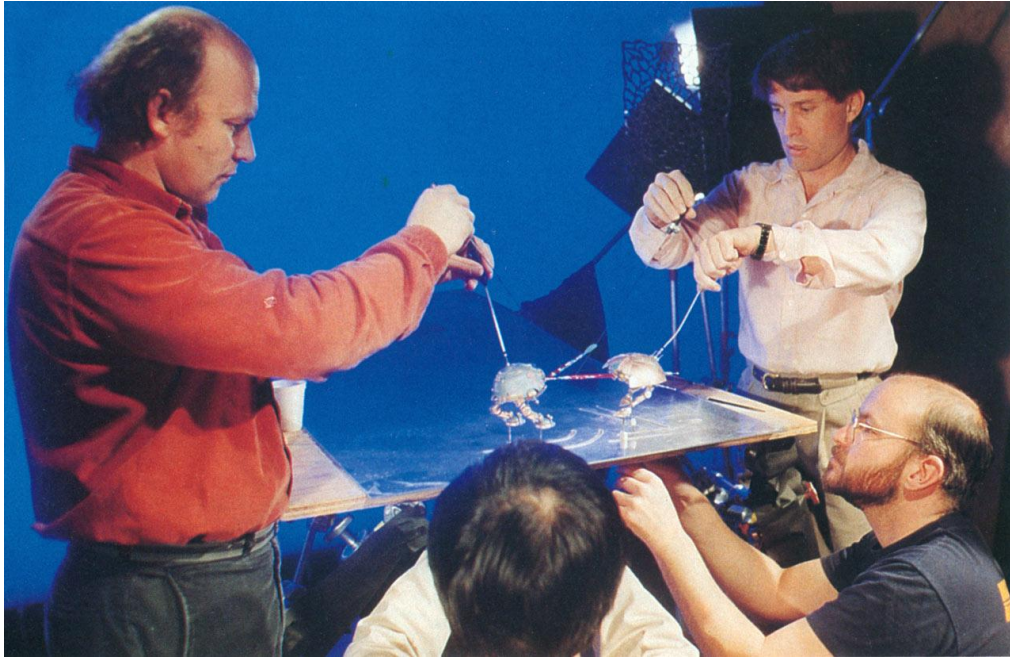
"The countertop shot was one of our most difficult because of all the action that had to be crammed into something like a hundred and seventy frames. Jetsam steps off the plate and looks like he's lost. He doesn't know what to do — he's afraid of being noticed. He looks at the guy who was about to eat him and does a little take. Then he looks to one side of the counter and over at the other and begins stepping backwards until finally he tumbles over the edge. We had slots running all over the plexiglass to get that shot — and frankly, I think there was just a little too much business. Generally we did most of our rod puppet shots at about eight to twelve frames per second — which worked out quite nicely. But on this shot we had to turn the camera speed way down to get everything in and to me it looks a bit Keystone Kop-ish. Also, if you look at the background very carefully, you will see a lot of tricks going on — things like held frames to milk the shot for extra length. Even at that we didn't have quite enough plate to get in everything that Matthew wanted."

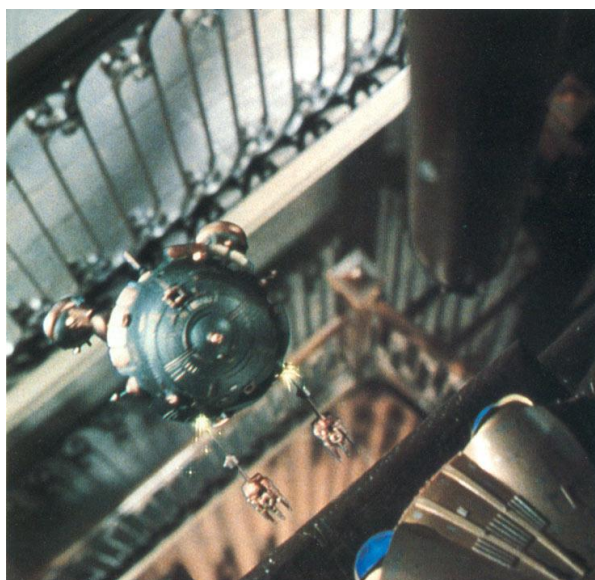
Since the countertop was a shiny surface, it was determined that a reflection would be needed to tie the stumbling Jetsam into the live-action plate. The job fell to optical and animation. "To begin with," said John Ellis, "I took the separations and just made a hamburger against black. Then I gave it to John Knoll who turned it upside down and plotted it on our Mechanical Concepts animation stand so that it was an exact reflection of itself. After that I was able to put it into the shot at a partial exposure and make it look just like a reflection."

In a few isolated instances, the rod puppeteering technique









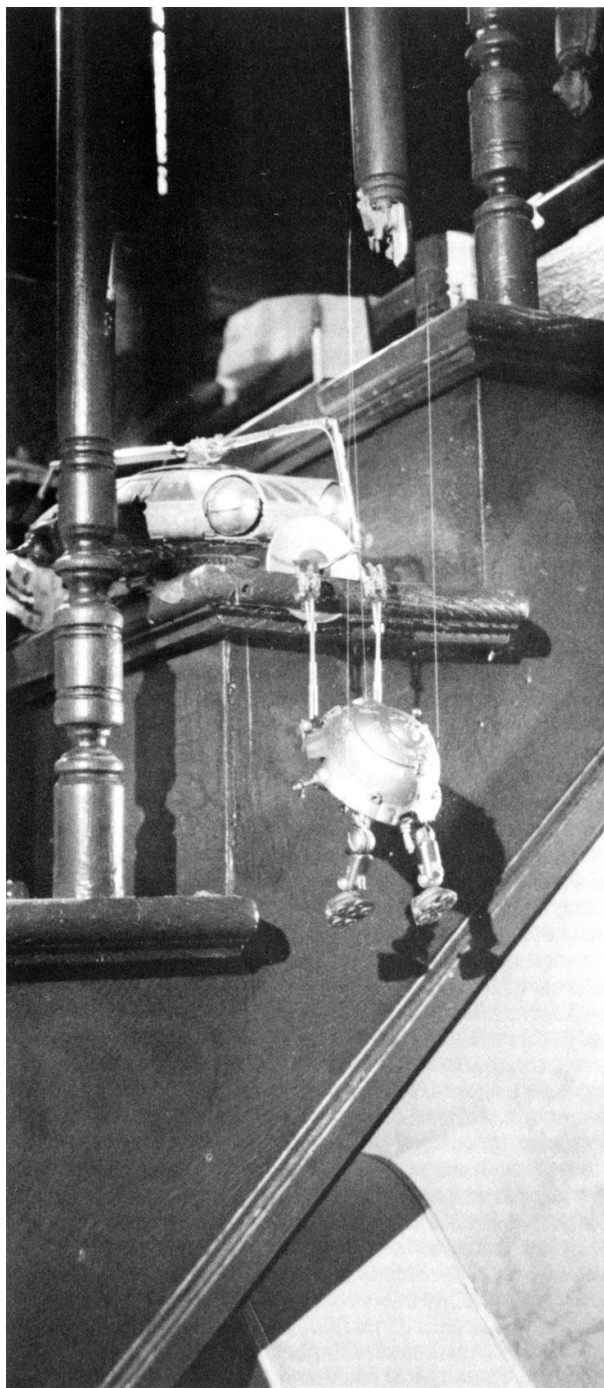
"For a momentary effect we could create something acceptable for a second or two," said Allen. "In this instance, the little saucers are looking at the nude painting and Marisa tries to cover their eyes by throwing a brush cloth onto them. We did that by running a couple of dog-leg rods up through the table — maybe six or seven inches behind the saucers so the holes were covered up by their bodies. Then we made a bend in the rods and connected them to the back of the saucers where they wouldn't be seen. Those puppets had mounting holes all over them, so that was no problem. Then we just got out of sight and animated along with the live-action."

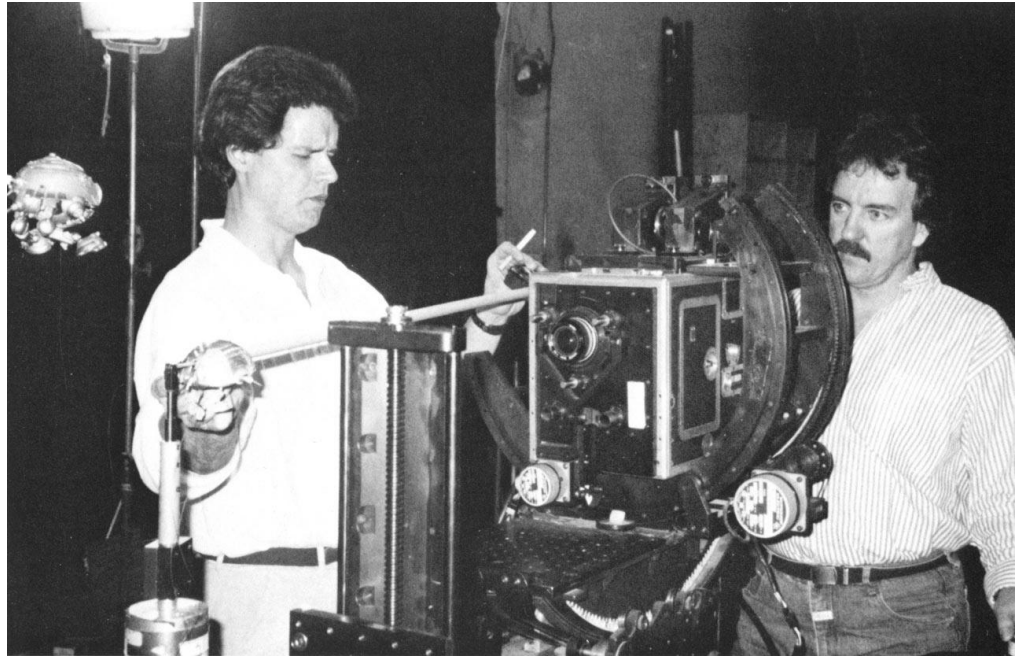
Elsewhere in the sequence, postproduction bluescreen work was employed to achieve more difficult choreography. "At one point we had to have the saucers swordfighting with paint brushes," Allen continued. "That was one of the few instances where we photographed both puppets at the same time, so we needed four puppeteers — one for each set of legs and another to control the heads and paint brushes. That way we were able to do a slow-motion kind of exchange with sword hits going back and forth. Later in the scene — when they run around the table and knock over bottles and things — we shot the puppets separately, so all the choreography had to be timed with a stopwatch to insure that everything happened at the right time and in the right place. Both shots are pretty good. I wouldn't say that one looks any more interactive than the other."

Not all of the baby saucer shots were done with the rod puppeteering technique. In one scene, Weems slips down a kitchen sink and emerges somewhat later in a toilet bowl. "For the toilet shot," said Allen, "I attached the Weems puppet to a computer controlled lifting device that had a little ball joint on the top so I could manually waggle him around a bit as he came up. Without that side-to-side movement, it would have looked like he was on an elevator. As the shot progresses, he pulls himself up onto the seat; so as soon as his feet came into view, I had to disconnect the mover and resort to old-time Willis O'Brien stop-motion." While Willis O'Brien would most likely have devised a toilet bowl that enabled him to animate inside it, the approach employed by Allen was somewhat simpler if less straightforward. "The puppet and the toilet lid were shot bluescreen and matted into a plate containing the rest of the toilet and the bathroom. That seems to be the *modus operandi* at ILM. It creates more work in optical, but gives them greater flexibility in staging the shot." As a parting gag, when Weems opens his mouth in a mechanical gasp for air, an optically inserted bubble was made to form and float away.

While acknowledging the advantages of rod puppeteering over traditional stop-motion — advantages having to do mostly with saving time — Allen is nonetheless reticent to give himself over totally to the technique. "Rod puppeteering is really good

To maximize output during many of the shots were with rod puppet supervision. Though we composited necessary more than at a time, which Flo's duel with required some interaction puppeteer Krzanowski. Allen and I were engaged two figures. The rod puppet choreography was complex for which Jet's inside a clock attempts to unnoticed countertop also befall gets washed and has to of a toilet assistant I operator I prepare for scene. Stop panels we underfoot walking so interfere and transmiss from behi







Sam's spinning in midair like Wile E. Coyote just pumping away and his arms coming from the side of the stairs. The following cut he drops down and bounces against the wall and produces the saw. What I did there was screw through his hands and just screw them together. However, as I was animating him kick, he popped off its screw and I had to put it back in. Naturally you can see it just a little bit. The camera was on a friction tripod head that was screwed to the stairs out of sight. The mount had a slider like a reading lamp or a dentist's drill. The tripod head went up and down the slider. The end of this double rod arrangement was attached to the ground. Basically it was just a simple lever to hover about. The actual scene was much simpler than it appears in the film, but Matthew was not featured enough when we stayed back so he directed that an optical move be made. The camera is trucking slowly forward and gradually framing the baby out and coming back as the saw is revealed. It was actually a trucking on past my animation of the baby.

Working on the same set, Allen also had a shot of the whirling saw blade slicing through the air, dislodging both it and the tiny scrambling baby. The most interesting aspects of the shot were the camera moves. Though it starts out at the bottom of the frame, the camera is trickling down, and then trucks up to hang on and the baby comes out as she finishes. This thing was shot without a camera move. The camera mount a Vistavision camera on its side so that the camera — top to bottom — was included in a vertical camera move. A camera move was put in with an optical effect. In addition, there were quite a few tricks that we used a lot of false cuts in the wood areas where the saw could go without anything. The saw itself had a little motor put on to make the blade turn so that as it came down it would vanish into a blur. The sawdust was optically — before the scan. When it came down, I rigged up a way of getting the sawdust by attaching three small wires to the pup and pulling them through a series of eyelets on the stand just away from the lights and running them like a venetian blind. I would make little adjustments as the camera turned over for a second cut. I could lower him down to get the correct height. I probably made the fall a little less chaotic.

permission within the building and to arrange for the crowd and traffic control needed to keep pedestrians and automobiles from crossing the desired matte line. Further delays were incurred waiting for ideal weather and lighting conditions. Finally Evans and his third unit matte crew — including Craig Barron — were ready. As with the earlier shot, vertical format Vistavision was to be the medium. "We took our Vistavision camera up to the balcony on the tenth floor where we had set up a platform, a huge sheet of glass and a scaffolding frame," Evans continued. "We then tented in the whole camera position so that we were looking from inside a black tent out through the glass and straight down Liberty Street with the World Trade Center over on the left. Next we blacked out the sky and a section to the right of the frame and also an area that literally went down to just above the heads of the pedestrians — which was necessary because we wanted to eventually paint the cafe in at the sidewalk level. It was a very delicate matte fit. At the appointed moment we ran off several takes and then broke down the set and left with our very precious roll of latent image film. Back at ILM, we cut off a piece of the film and developed it. I was thrilled to see that even though the lighting conditions were quite difficult — very contrasty, with some nearly black buildings in the shadow areas and then very bright ones in the sunlight — Craig Barron had made an absolutely perfect exposure. Then I did a painting adding sky, the distant buildings, one of the skyscrapers of the twin towers and the top of the other tower. And of course I painted in the old tenement building — very small in between these two giant skyscrapers. As part of the process, I also painted out any signs on the nearby buildings that would indicate where we really were. Finally, I added a plaza with a fountain — and in the middle of that fountain we poked some holes through the painting and did a little slot gag to suggest water spraying up." Fully assembled in vertical Vistavision, the latent image matte shot made a final stop in optical where it was scanned to impart a mock camera move that commenced at the top of the skyscrapers and then traveled on down to street level — with a little push in at the end to draw attention to the tenement before the final credits began to roll.

For all concerned, the work in *Batteries Not Included* represented a major advance in the ongoing quest for seamless integration of live-action stage effects and postproduction opticals. "Achieving a perfect blend was really the bottom line on this show," Bruce Nicholson concluded. "Whether the film worked or not was dependent upon it. For me — especially with my strong background in optical — it was a very interesting challenge. Could we really pull it off? And I think we did. In the very beginning it was Steven Spielberg who had encouraged us to try and do some of the saucer work on the set. Two years later





